

CHAPTER FOUR Performance Element

Congestion management agencies must evaluate how well their transportation systems are doing in meeting their CMP objectives of reducing congestion and improving air quality.¹ Specifically, the CMP must contain performance measures that evaluate how highways and roads function, as well as the frequency, routing and coordination of transit services. The performance measures should support mobility, air quality, land-use and economic objectives and be used in the various facets of the CMP.

Combined with roadway LOS standards, the performance element will provide a basis for evaluating whether the transportation system is achieving the mobility goals in the CMP. These include developing Capital Improvement Program, analysis of land-use impacts and preparing deficiency plans to address problems. Integrating these CMP elements may occur in the future after some experience implementing the performance element. For the 2005 CMP, implementation of the performance element will help the CMA prioritize projects for funding and development of management and operations strategies.

The Legislature intended for the performance element to include new performance measures in addition to roadway level of service and transit routing, frequency and service coordination.

However, only the roadway level-of-service standards will be used to trigger the requirement for a deficiency plan.

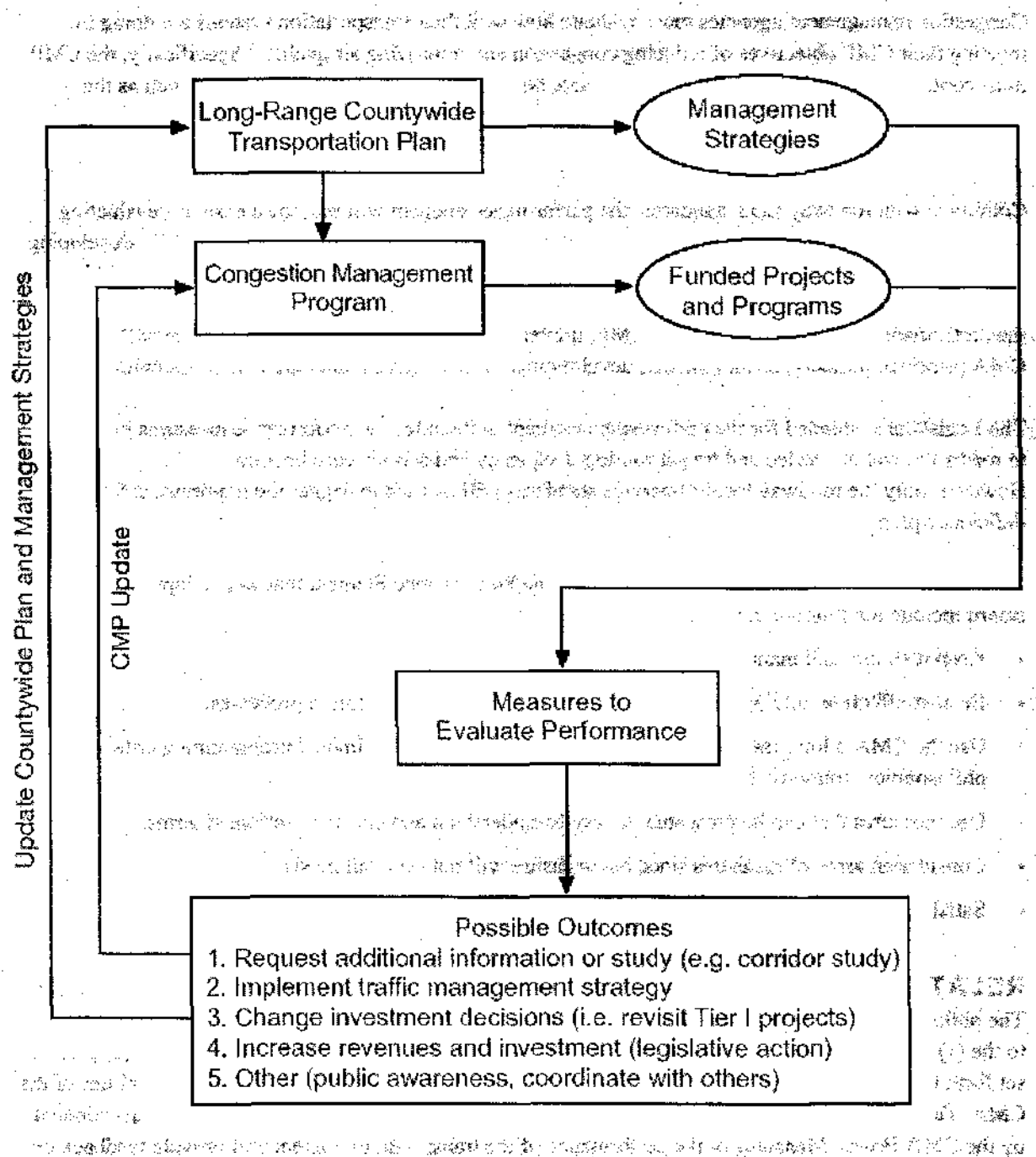
Guiding principles for use in the development of the Performance Element that were adopted by the CMA Board include the following:

- Keep it simple and manageable.
- Be cost-effective, relying on available data and established monitoring processes.
- Use the CMA's long-range transportation goals and MTC's multimodal programming criteria as a philosophical framework.
- Use measures that can be presented in easy-to-understand and consumer-oriented terms.
- Consider an array of measures since one measure will not serve all needs.
- Satisfy state (AB 1963) and federal (ISTEA and TEA-21) requirements.

RELATIONSHIP TO COUNTYWIDE TRANSPORTATION PLAN

The philosophical framework envisioned for the performance element is to relate performance measures to the (1) goals and management strategies in the 2004 *Countywide Transportation Plan* and (2) policies set forth in the CMP. Figure 9 shows how the performance element relates to other responsibilities of the CMA. Table 9 shows the relationship between performance measures and the long-range goals adopted by the CMA Board. Measures of the performance of the transportation system will provide feedback on the effectiveness of management strategies and investment decisions.

Figure 9 — How Performance Measures are used in the CMP



¹ California Government Code Section 65089(b)(2)

PERFORMANCE MEASURES

Performance measures to be used are listed in Table 9. The measures encompass all modes of transportation. Peak and off-peak travel periods are considered for typical weekdays. Measurements of current conditions rely primarily on available data and established data collection processes.

During the 1995 update of the countywide travel model, the model was tested for applicability to forecast additional performance measures. These include:

- person trips by mode,
- vehicle volume by roadway segment,
- vehicle miles traveled by facility type,
- modal share,
- volume-to-capacity (v/c) ratios by facility type,
- vehicle hours of travel by facility type,
- lane miles by v/c ratio, and
- capital costs.

The Model Update Report also recommended some additional measures that could be implemented with additional work. These include:

- person miles traveled by mode,
- passenger boarding by operator or line,
- travel time by mode,
- travel speed by mode,
- key trip interchange travel time by mode,
- vehicle hours of delay by facility type,
- duration of congestion by facility,
- households within target drive time of employment center,
- households within target transit time of employment center,
- time spent in congestion, and
- transit accessibility.

A more detailed description and definition of each adopted performance measure is presented below.

Acceptability of Data

A suggested approach to ensure that data collection methods are acceptable to the CMA is described in "Establishing the Existing Level of Service for the Alameda County CMP-designated Roadway System".² This applies to speed and travel time data. An ongoing process will be necessary to review definitions and methods to ensure that the information is collected in a consistent manner prior to use in trend analyses.

System Definition

While the statutes clearly require designation of a CMP system for purposes of level-of-service monitoring, they provide no guidance for the selection of a system for the performance element.

Table 9 — Performance Measures

Performance Measure	Long-Range Goal	Objective In Statute	Required Data	How Results Can Be Used	Cautionary Notes Concerning Use Of The Data
Average Highway Speeds	Improve Mobility Air Quality	Mobility Air Quality	Current Requirement Average speeds on CMP network	Level of Service determinations. Trigger Deficiency Plans. Evaluate direct effectiveness of projects in relieving congestion.	Adequate for determining CMP conformance. Caution in use as a measure of mobility.
Travel Time Transit, Highways, HOV Lanes	Improve Mobility Increase Transit Use Improve Air Quality	Mobility Air Quality Land Use	Average travel time between selected origin-destination pairs. Obtain from annual level-of-service monitoring data and transit schedules	Useful in analyzing trends, comparing alternatives or as an evaluation of the effectiveness of the Countywide Transportation Plan. Problems can be spotted for targeted investment. Can compare travel times via roadway and transit along major corridors.	Caution in a reliance on data collected on a few days each year which is not always representative of conditions throughout the year.
Duration of Traffic Congestion	Enhance Economic Vitality (Expedite freight movement)	Economic Air Quality	Hours of Congestion at key locations	Could be used as trigger for certain traffic management strategies to contain congestion to normal peak periods to maintain smooth truck travel during mid-day.	Caution in a reliance on data collected on a few days each year which is not always representative of conditions throughout the year.

² Abrams Associates, November 26, 1991

Performance Measure	Long-Range Goal	Objective In Statute	Required Data	How Results Can Be Used	Cautionary Notes Concerning Use Of The Data
Roadway Maintenance	Ensure serviceable operation of existing facilities	Economic	MTC's Pavement Condition Index	\$ Amount of maintenance backlog for MTS roadways. Useful in guiding investment decisions for roadway maintenance needs.	Reliability dependent on subjective assumptions made by local agency staff. Assumptions can change annually depending on staff person conducting the estimate.
Roadway Accidents on Freeways	Improve mobility, Ensure serviceable operation of existing facilities	Mobility Air Quality	Number of accidents/ number of miles; From Switzer/ TESIS System	Identify safety issues. Useful in guiding investment decisions.	Data not available for local streets/roads. Accidents may not be caused by physical facilities.
Completion of Countywide Bike Plan	Improve Mobility, Air Quality	Mobility Air Quality	Miles and Percent Completion of Bikeway Plan	Progress toward a connective system of countywide bikeways	Does not reflect actual use of bicycle facilities.
Transit Routing	Improve transit access and increase transit use	Mobility Air Quality Land Use	Current CMP requirement	To determine area coverage and proximity of transit service to residential areas and job centers.	Proximity to transit stops or stations is an important indicator of accessibility; however, the data is difficult to collect.
Transit Frequency	Improve transit access and increase transit use	Mobility Air Quality Land Use	Current CMP requirement Number of lines operating at each frequency level	To determine convenience of transit service.	
Coordination of Transit Service	Improve transit access and increase transit use	Mobility Air Quality	Current CMP requirement	To determine reliability and convenience for travelers connecting between services.	Current CMP requirement does not provide much information.
Transit Ridership	Increase transit use	Economic Air Quality Land Use	Number of patrons	Trend analysis; comparison between operators	Does a loss of transit ridership indicate that investment in transit should increase or decrease?

Performance Measure	Long-Range Goal	Objective In Statute	Required Data	How Results Can Be Used	Cautionary Notes Concerning Use Of The Data
Transit Vehicle Maintenance	Ensure serviceable operation of existing facilities	Air Quality	Mean time between Service Delays (BART) and Miles between Mechanical Road Calls (AC, LAVTA, Union City Transit)	Trend analysis; comparison between operators. Transit agencies have internal standards for comparison and investment allocation decisions.	

The Metropolitan Transportation System is proposed for use in the Performance Element. The Metropolitan Transportation System is recognized by MTC in the context of programming decisions as well as in estimating roadway maintenance needs. The Metropolitan Transportation System is also recognized by the CMA in the Land-Use Analysis Program as the focus of transportation analyses.

Description of Performance Measures

Average Highway Speeds

As currently measured by the CMA, this is the average travel speed of vehicles over specified segments measured in each lane during peak periods. This measurement is made a sufficient number of times to produce statistically significant results.

Travel Time

Calculated for up to 10 pairs of origins and destinations (O-D) using floating car data to determine average roadway travel time and transit time between these O-D pairs. These O-D pairs will reflect major corridors in Alameda County.

Duration of Traffic Congestion

As defined by Caltrans, this is the period of time during either the a.m. or p.m. peak that a segment of roadway is congested (average speed is less than 35 m.p.h. for 15 minutes or more). Data are collected by Caltrans from floating car runs conducted in April/May and September/October each year and reported annually. The CMA may be able to collect similar data on the remainder of the CMP network by conducting floating car runs earlier or later, where necessary, to observe the beginning and ending of the congested period.

Roadway Maintenance

As defined by MTC, this is based on the roadway Pavement Condition Index (PCI) used in MTC's Pavement Management System. The PCI is a measure of surface deterioration on streets and roads.

Roadway Accidents

The number of accidents per one million miles of vehicle travel. The data is collected by Caltrans as a part of the State Switzer/TASIS System.

Percent of Countywide Bike Plan Completed

Will be measured in terms of the number of miles and the percentage completed of the countywide bikeway plan.

Transit Routing

Refers to both the pattern of the transit route network (e.g., radial, grid, etc.) and the service area covered (e.g., percent of total population served within one-quarter mile of a station/bus stop or percent of total county served, etc.). Measurement of routing performance may be applied at the corridor or screenline level, to give operators flexibility in locating service routes.

Frequency of Transit Service

Refers to the headway, which is the time between transit vehicles (e.g., one bus arrival every 15 minutes). Service should be frequent enough to encourage ridership, but must also consider the amount of transit ridership the corridor (or transit line) is likely to generate, as well as the capacity of the existing transit service in that corridor.

Coordination of Transit Service

Refers to coordination of transit service provided by different operators (e.g., timed transfers at transit centers, joint fare cards, etc.). Performance should be aimed at minimizing inconvenience to both the infrequent and frequent user. The information provided by transit agencies should address the questions: Is there coordination and how convenient is it?

Transit Ridership

The number of average daily passengers boarding or de-boarding transit vehicles in Alameda County.

Transit Vehicle Maintenance

AC Transit and the Livermore-Amador Valley Transit Authority refer to "Miles between Mechanical Road Calls" as a measure where mechanical road calls are defined as the removal of a bus from revenue service due to mechanical failure. BART and ACE have a related term known as "Mean Time between Service Delays." Delays can be caused by personnel or by mechanical failures.

TRANSIT SERVICE PERFORMANCE MEASURES

The following transit service performance measures proposed for CMP purposes are derived from the service standards of the transit operators in the county as expressed in their short-range transit plans or other policy documents.

Transit Frequency

Table 10 shows performance measures for bus and rail transit in Alameda County. These measures apply to both existing services and future year (proposed) services.

For ferry services from Alameda and Oakland to San Francisco, the frequency measure is one vessel per hour during the a.m. and p.m. peak periods.

There is currently no light-rail service in Alameda County. Light rail is being investigated as a service alternative by AC Transit for several corridors.

Routing

Performance measures for routing and area coverage vary by transit operator. AC Transit bases its current and future year bus route spacing (the average distance between bus lines) on residential densities, the location of major activity centers, topography and street patterns. Route spacing in commercial areas is determined by location, level of activity and layout of the development, on a case by case basis.

For existing and future services, the Livermore-Amador Valley Transit Authority proposes the following performance measures:

- Ninety percent of the population should be within a one-half-mile radius of peak-period transit service, not including services with fewer than three trips in each peak period, and 80 percent of the population should be within a one-half-mile radius of midday transit service.
- Ninety percent of employment centers with 100 or more employees should be served by 30-minute peak-hour headways.

For existing and future services, Union City Transit proposes the following performance measures:

- Ninety percent of all land with three or more dwelling units per acre within one-quarter-mile of a transit route
- Ninety percent of major activity centers within one-eighth-mile of a transit route

BART proposes an existing and year 2010 load factor (i.e., the number of persons on board divided by the number of seats) of 1.15 during peak period and a load factor of 1.0 during off-peak hours. The average peak hour, peak direction transbay load factor for the four routes is 1.35.

Table 10 — Performance Measures for Frequency of Transit Service

SERVICE TYPE	TIME OF DAY				
	Peak	Midday	Night	Owl	Sat/Sun/Holiday
(minutes between services)					
Bus					
Primary Trunk	15	15	30	60	15
Secondary Trunk	15	30	30		30
Local	30	30	60		60
Suburban Local	45	60			
Transbay Basic	15	30	60		60
Transbay Express	30				
East Bay Express	30				
BART Express Bus*	60				
Rail					
BART	3.75-15		up to 20 (off-peak)		
Ferries	60	60			60

* As of July 1, 1997, operating responsibility for BART express bus service was transferred from BART to local operators, i.e., LAVTA and County Connection, except for the service in the I-80 corridor. Responsibility for this service was transferred to WestCat on July 1, 1998.

Performance Measures for Coordination of Transit Service

A number of measures are in place to ensure coordination among transit operators. They include Senate Bill (SB) 602, legislation preceding SB 602, MTC Resolution No. 3055 (Inter-operator Transit Coordination Implementation Plan) and others. All transit operators in Alameda County will continue to implement the coordination projects required under these guidelines. The projects are specified each year in agreement among the operators and MTC. They relate to coordination of the following:

- fare
- schedule
- service
- public information
- marketing
- administration

Review Process

The CMA will prepare an annual transportation performance report for review by local agencies and transit operators prior to publication. The report will include the most current available data from the various agencies that will serve as sources of data; however, the CMA will accept performance data that is up to two years old. The report will be available prior to the time when the CMA prioritizes transportation improvements for inclusion into the Countywide Transportation Plan and *Regional Transportation Plan (RTP)*.

Preparation of the transportation performance report is recommended for the April-May period to coincide with the development of the project prioritization for the *Countywide Transportation Plan*, which occurs in the spring of even-numbered years and the availability of the Caltrans' highway congestion monitoring data.

The transportation performance report will include estimates of population growth during the preceding year, available from the State Department of Finance. The 2003-2004 Performance Report is available upon request at the CMA offices.

LOCAL GOVERNMENT AND TRANSIT AGENCY RESPONSIBILITIES

To minimize cost, the CMA will rely on established data collection processes and regularly published reports for data. Below is a list of established data collection efforts.

Cities and County

- Pavement Management System data for the Metropolitan Transportation System (except Albany and Oakland)
- Countywide Bicycle Plan (County Public Works Department and CMA)

Transit Agencies

- Service Schedules, On-Time Performance
- Transit Ridership Routing (percentage of major centers served within 1/4-mile of a transit stop)
- Frequency (number of lines operating at each frequency level)
- Service Coordination (number of transfer centers)
- Average Time between Off-Loads (BART)
- Miles Between Mechanical Road Calls (AC Transit, LAVTA and Union City Transit)
- Mean Time Between Service Delays (BART and ACE)

MTC

- Roadway Maintenance Needs

Caltrans

- Freeway Speed Runs, Duration of Freeway Congestion
- Accident Rates on State Freeways

CMA

- Roadway Speeds on CMP, except freeways
- Travel Times for O-D pairs

COMPLIANCE AND CONFORMANCE

Local agencies are encouraged to provide PMS data to MTC or maintain their own database of maintenance needs on the Metropolitan Transportation System. However, there are no compliance requirements for local agencies or transit operators related to the Performance Element.

In the future, the CMA may consider the use of one or more performance measures in the development of:

- Land-Use Analysis Program - Tier II (review of cumulative effects of land developments)
- environmental studies for transportation improvements
- corridor studies
- CMP Capital Improvement Program